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COMMITTEE ON EDUCATIONAL RESEARCH
The University of Alberta

A SPECIAL ISSUE
THE USE OF COMPUTERS IN EDUCATION

A special issue on The Use of Computers in Education is being planned for 1969. Several manuscripts are in hand but scholars interested in this area are invited to submit manuscripts or give notice of intention to do so.

Editorial Comment

In the June issue of the Journal, an invitation was extended to interested scholars to submit articles for a special "theme" issue which is being planned for 1969. The theme for the special issue is to be *The Use of Computers in Education.* We would appreciate being advised of intention to submit an article so that tentative plans for the publication may be made as soon as possible.

As suggested in the previous editorial comment, manuscripts of two types are pertinent to the theme of the issue. One type of article will set forth a rationale for the "involvement" of computers in education. These articles will be broadly based to set the stage for an insightful look at the role of computers in education. The second type of paper will be more specific, dealing with the use of computers in research, instruction, and curriculum building in education. A statement of the contents of the article you propose to submit would be useful to the Editor as plans for the issue are formulated.

* * *

In this issue of the Journal, we have three basic types of research reported in the several articles. One report deals with an evaluation of an approach to historical enquiry. Two articles report the results of experimental studies. The third type of article might be classified as an investigation—an investigation designed to explore the relationships of variables operating in a specific situation.

In the first article, Hodysh discusses the strengths and weaknesses of Berlin's approach to historical enquiry. On the basis of his evaluation, he suggests the modification of the research method that would be necessary in a consideration of the complexities of educational history.

The two experimental studies reported are those of Knowles and Boersma, and of Briggs. Knowles and Boersma report a study of a narrow, well-defined element in the process of concept formation. They compare groups of culturally different children on reversal-nonreversal tasks designed to reveal the development of mediational responses. Briggs presents the results of a preliminary study comparing the results of two counselling methods, one of which is a relatively untried method of directive group counselling. His study, though it does not support definitive statements of the superiority of one or the other methods, does offer sufficient evidence to justify further experimentation with directive group counselling.

In their report of another facet of a study of the merit of failing grades, Storey and Patterson present findings concerning two groups of high school students. One group of students had repeated a high

school social studies course and the other group, similar in achievement, had not repeated the course. Their findings do not support failure as a means to preparing students better for further study in a subject area.

Conklin and Ogston present the results of an investigation of the relationship of some measures used to select students for university entrance and the grades attained by these students after one year of university study. Their results point up some serious weaknesses in many often-used measures. The predictive value of measures other than high school average proved to be low.

MacLeod and Knill extend the investigations of the adolescent subculture of the high school. Specifically, they report the relationships of social class to participation in students' councils in the high school. Their results lead them to question whether students' councils actually provide training in democratic processes.

* * *

The response of subscribers to the choice of a subscription year—January to December or September to June—has been positive. We are pleased that this modification in our business procedures has been well-accepted.

P.A.L.

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According to Isaiah Berlin, the complexity of historical events prevents the study of history from becoming "scientific." The author presents the view that Berlin's theory limits the techniques of historical inquiry. The historian of education, in keeping with the principles of historiography, should select any procedures which enable him to interpret the past.

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Historical Inquiry and Educational History

In his polemic "The Concept of Scientific History" Isaiah Berlin (1961, pp. 1-31) questions the "scientific" approach to historical inquiry. The complexity of historical events is fundamental to his position. Although his ideas are applicable to the history of education, much of what he says is open to question.

Berlin's arguments are presented through a comparison of the natural and social sciences of history.[1] After indicating variant trends in the approach to historical study, Berlin associates the inductive-deductive principles of science with the view that historical events move on the "river of time," and that their never-ending pattern must exhibit regularities capable of being condensed into laws. Following the refutation of this position, Berlin states what he considers to be a crucial difference between natural science and history.

> It seems clear that whereas in history we more often than not attach greater credence to particular facts than to general propositions, however well supported, from which these facts could in theory be deduced, in a natural science the opposite seems to be the case: there it is more rational to place credence in a properly supported general theory . . . than in specific facts [p. 9].

He emphasized the generalizing nature and strict logical interconnectability of laws in the natural sciences, and loose, general statements of history whose credulity must be supported by "judgement" and "intuition." Although historians may attempt to write a scientific history,

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1 Depending on the context, history might be considered as either that which has actually happened or that which has been recorded. See W. Dray, Philosophy of history. (Englewood Cliffs, N.J.: Prentice-Hall Inc., 1964. P. 1.)

the outcome is necessarily vague, inconclusive, and impracticable because of the mass of unsifted, interdependent factors that bear upon any historical question. Berlin's attack is continued upon the speculations of Hagel and Toynbee and specialized disciplines such as the history of technology. He admits that these systems satisfy some of the criteria of natural scientists, "but only at the expense of leaving out the greater part of what is known in the life of human beings whose histories are in this way recorded [p. 13].

The effectiveness of scientific models, which are directly dependent on their simplicity, is the next topic of Berlin's interest. Since history is infinitely complex, the scientific model, or any model for that matter, is of doubtful if any value. He writes:

> . . . the greater the number of similarities we are able to collect . . . the more successfully we abstract, the simpler our model will be, the narrower will be the range of characteristics to which it will apply, the less we shall be able to exclude, and, consequently, the more complex the model will become and less precisely it will fit the rich diversity of objects which it is meant to summarize, and consequently the less of a model . . . it will necessarily be [p. 14].

The most rigorous and universal of all models is that of mathematics which operates at the highest level of abstraction from nature. As the sciences move down the scale, Comtean fashion, they become richer in content and less susceptible to the rigor and quantification applicable to the so-called "hard" sciences. History for Berlin is at the bottom of this scale.

Additional contrasts are made. Differences in events are the main interest of historians, whereas their regularities are the concern of scientists. Science also employs inductive and hypothetico-deductive measures, whereas historians rely on an amalgam of observation, intelligence, imagination, and empirical insight. Experimentation is also the trademark of science. The natural scientist provides scientific models of explanation; the historian relies on *Verstehen* (Nagel, 1963) to reconstruct the historical circumstance.

Having outlined his method of history, Berlin exclaims that "history is what historians do" and cautions the reader to remember the "inner" and "outer" natures respectively of historical and scientific studies. The scientist seeks factual knowledge or the "outer" conditions. The historian probes understanding or the "inner" events. Berlin thus attempts the removal of a rigorous scientific ground from history and relegates much of the past to an inquiry necessarily of a subjective nature.

An evaluation of Berlin's work in the light of educational history[2] is difficult. A number of issues, however, are deserving of comment. The depth, complexity, and richness of historical events have not been

[2] One might distinguish between history of education which emphasized the institutional study of education, and educational history which views education in its informal setting as well as in its formal institutional aspects.

overlooked and seem to reflect the crux of Berlin's methodological position. It is certainly true that the variables in any historical situation and their effect upon groups or individuals are often not readily known or even open to possible discovery. The reasons underlying the unpredictable as well as the purposeful actions of that totality, man, remain enmeshed in the "subconscious," forever hidden from precise empirical tools of investigation. The problems here are manifold. Can the historian *know all the facts?* What do we mean by "know"? What do we mean by "facts"? The value of *Verstehen,* retrodiction, and other devices thus become indispensable to the historian for completing his inquiry. Berlin is aware of the values and cultural biases of this historian, a model or models which affect the investigator's selection of facts and their interpretation. Even the "positivist" historian interprets and organizes facts on a set of criteria that may rest on "irrational" grounds.

The admixture of philosophy and methodology in Berlin's work, however, is in need of further clarification. He has told us how history is sometimes but not always written; he has further delimited himself to an acceptance of the *status quo* in historiography. Analysis of his work raises questions as to the possibility of improving historical techniques and as to the possibility of increasing the sophistication of the critical philosophy behind the historical facade. "The Concept of Scientific History" is not so much a denial of the value of scientific techniques applied to history, as the denial of the value of a scientific ideal in the study of history. There is a tendency to decry the importance of "precization" within methodological processes, the adoption of which Berlin assumes would destroy the independence of history as a separate discipline. As an alternative to the scientific ideal, Berlin offers a type of "historian's mystique" and insight which in part apparently rests on a "qualitative, quasi-intuitive form of thinking [p. 17]."

Historical happenings are a rich complexity of factors, unclassifiable and unique. The historian must employ his ingenuity, particularly his subjective insight into the affairs of men, to introduce into the thread of historical thought a semblance of continuity and probability. Scientific tools are ancillary for the historian. These views are indicative of the free-will theorist, the opposite of which is the determinist, who for Berlin invariably exhibits an empirical frame of mind.

Another of Berlin's concerns is the distinction of the natural sciences from history, insofar as the former employ a language often technical in nature and devoid of the normal moral and psychological concepts of daily speech. He then separates, for example, the history of technology from general history on the above basis. This distinction raises a twofold problem: first, whether or not there can be a history of technology or of education, empty of the cultural context, as suggested by Berlin;

and second, if so, whether or not Berlin's criterion for such a separation is sound.

A fundamental difficulty with Berlin's work, and almost any discussion of a philosophical or methodological nature is the matter of definition, the lack of which results in vagueness and deception. Berlin fails to heed the need for definition and thus introduces such crucial distinctions as "insight," "scientific reasoning," "self-consciousness," and others without delineation by either specific identification or even contextual clarification, thereby leaving what is meant to the reader's own interpretation. This leads to contradiction. Berlin, for instance, employs the term "science" both as a technical device and as a separate discipline, not bothering to elucidate what he means. He then criticizes the value of scientific explanation for historical analysis but admits its value as an ancillary procedure.

Similarities and differences between history and natural science are also key concerns. Berlin's emphasis on the differences, to the exclusion of similarities, tends to create a greater gulf than need exist between these approaches to knowledge.

> The purpose of historians, as has often been repeated, is to paint a portrait of a situation or a process, which like all portraits seek to capture the unique pattern and peculiar characteristics of its particular subject; not to be an x-ray which eliminates all but what a great many subjects have in common [p. 19].

The claim that historical events are unique and hence unclassifiable is countered by Q. Gibson (1960) who believes that the difficulty rests on:

> . . . a simple verbal confusion which can be cleared up without much difficulty. What, after all, is meant by those who insist on the uniqueness of an event? They are hardly likely to mean merely that such an event is a *particular* event, numerically distinct from others. For in this sense every event is unique, the swing of the pendulum as well as the French Revolution. And anyway, the particularity of events of whatever kind is not something which we could be said to miss when we describe them. In giving a description we do not merely name features to the particular event in question. Abstraction of features and reference to particulars may clearly go along together [p. 9].

It would seem that the extent to which we regard something as an instance of a type or as unique is a function of our point of view or interest. The need for the historian to provide reasonable explanations of events requires that he be aware of the use of both particularity and generality (Cahnman and Boskoff, 1964).

Related to this question is that of explanation. Berlin distinguishes between scientific and historical explanation on the basis that the former involves a strict set of hypothetico-deductive and inductive procedures, while the latter exhibits qualities of insight and psychological identification. This distinction seems to parallel the "outer" and "inner" meanings of history—if there are such distinctions. To suggest that in history an

explanation involving empathy is superior to one founded on principles of science is merely to emphasize a particular aspect or point of view. History, however, involves the totality of the past and requires all available techniques for its interpretation, even if such techniques are from the camp of science. Assistance can be gained by reference to W. Gallie's (1964) conception of history and explanation when he notes that explanations "in the sciences . . . play a supreme creative role: they mark the vital growing points as well as the points of positive achievement [p. 112]." He goes on to say:

> But by contrast, no one expects an historian to be an originator or unifier of the laws and theories which are exemplified in his work. What we expect from him is the ability to use other men's laws and theories, as and when they are relevant for his own purposes: which is to help us to see which is the most likely of a number of conceivable or followable developments in the difficult because imperfectly evidenced narrative that he is trying to present [p. 113]."

Gallie has moved a step further than Berlin in admitting the value of scientific explanation for history, but even here, his too rigid distinction between the function of explanation in the sciences and history tends to exclude even the possibility of employing a scientific explanation as a "story" in itself, for even a scientific explanation could be the complete story of history albeit expressed through the narrative or any other adaptable medium.

Berlin concedes that history must employ "all the knowledge and skills that we have acquired from whatever quarter," but he is quick to suggest that "a man who lacks common intelligence can be a physicist of genius." Like many in the field of philosophy, Berlin has perpetuated the unfortunate separation of man's quest for knowledge into competing, warring segments. History, for him is a separate discipline such as mathematics, biology, or sociology. What Berlin has failed to emphasize is that history employs *all approaches to knowledge* (models, if you wish) in order to obtain the best and most comprehensive view of historical events. The ensuing thoughts, I believe, are representative of the true inquirer in any endeavour:

> Human beings . . . are only on the threshold of the most preliminary steps to the mysteries of Man and the Cosmos.
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> . . . . . .
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> Thrown into an eternally changing universe, human beings cannot be tied by a set of rigid rules for language, thought, or action. Assuming that we, and most of our fellow beings choose to exist, and to increase our insight, perfect our knowledge about ourselves, our fate and our cosmic situation, we should never express any judgement of value or truth without carefully considering the status of present relevant research [Tennessen, 1965, pp. 40-41].

The educational historian, approaching his data with the ideal of objectivity, should have an awareness of the complexity of historical

events and the many factors affecting their presentation. In dealing with the formal as well as informal educative agencies such as the church, periodical press, and family, he should, as far as is possible, recognize his own values which could affect the interpretation of his facts. The history will be further affected by the selection of the topic of educational influence, the period of time with which the history is concerned, the availability of reliable data, and the specific purpose of this history.[3]

Providing that the educational historian does not contravene the principles of historiography (Barzun and Graff, 1957; Knopf, 1963), he should use any techniques that assist him in explaining the past. In accounting for the educational influence of the family, for example, he could refer to explanatory theories derived from sociology. By reserving the right to select any or all procedures of description and explanation, the historian is better able to interpret the complexity of educational history.

Historical knowledge thus occupies a commanding place in the researches and inquiries of mankind. Depending on one's definition, "history" is either an art or a science, or it is both, or it is neither. Most educational historians would probably agree, however, that history is the enquiry into the past of man with reference to actual educational events that have occurred. Man remains the key, for without him educational history cannot be written. The environmental and cultural forces become the indispensable setting.

Educational history, though a study in itself, frequently brings together the results of the investigations that the other studies conduct, and shapes them into a comprehensive account related to the course of historic events. Man seeks to increase his insight and perfect his knowledge of the world. This he accomplishes by using various models to describe and interpret the world. These models, depending on their goals or ends, become the interrelated disciplines of the natural, social and behavioural sciences, and the humanities—thereby assisting man in his task. The educational historian has at his disposal all of man's efforts. He should strive to improve the scientific techniques of historical research, and, being cognizant of the problems of complexity, he should make greater effort to attain historical understanding. He should remain flexible, and keeping in mind the purpose of his investigation, he should select, reject, or combine differing theories if they assist him in gaining even the most minute insight into the explanation of man's

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[3] The educational historian's purpose is dependent on the kind of history he wishes to write. For example, he may wish to examine in depth the curriculum of a formal institution of learning in which case he might produce a monograph study. On the other hand, he may wish to explain the numerous factors affecting the development of an idea in which case he may concern himself with either a broad cultural or social history.

historical past. Thus, his awareness of what Berlin considers to be the complexity of history would be tempered with scientific ideals vital to the development of knowledge.

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Optional shift performance of 40 eight-year-old suburban middle-class children was compared with that of a comparable group of North American Indian children on two types of discriminanda: concrete familiar objects and abstract pictorial material. The data showed that children from a culturally different environment, lacking in verbal experience, tend to display a retarded development of mediating responses in a concept formation task.

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Optional Shift Performance of Culturally-Different Children To Concrete and Abstract Stimuli[1]

The native Indian population in Western Canada manifests many of the difficulties in school learning tasks exhibited by "culturally disadvantaged" students studied elsewhere. Such factors as crowded dwellings, limited education of parents, unfamiliarity with time schedules, multiplicity of dialects, and poor nutrition have characterized the environment of many Indian children. A disproportionately small number of Indian students attains more than grade eight standing compared to the non-Indian population, with less than 1% progressing as far as grade twelve (Waller, 1965).

An important factor in this attrition would appear to be the lack of development of symbolic thought behaviour required by many of the school tasks. Several recent studies have found an association between the development of abstract thinking and experiential background, generally as indicated by indices of socioeconomic status (s-e-s). John

[1] This study was supported in part by the Indian Affairs Branch, Educational Services Division, Edmonton, Alberta, and A.A.C.E.S. Grant 20066.

(1963) found that lower-class children were surpassed by higher-class children on measures of labelling and categorizing behaviour. Higgins and Silvers (1958) found that Negro children of low s-e-s background showed poor performance on both the Stanford-Binet Intelligence Scale and a purportedly non-verbal test, Raven's Coloured Progressive Matrices.

The critical effect of disadvantaged environments is often of a verbal and conceptual nature (Bernstein, 1965; Clark, 1963; Deutsch, 1963; and Taba, 1966). As an example of the importance of verbal experiences, Prehm (1966) showed that verbal pretraining leads to significantly better performance on concept acquisition tasks among a lower s-e-s group of four to seven-year-olds. One explanation of the retarded development among disadvantaged children would be that, because of lack of verbal stimulation and experience, language does not come to serve a mediating function in directing behaviour and assisting learning. This mediating function is considered to develop once facility with vocabulary and syntax have been attained (Luria, 1957). Thus, facility with the communication function of language is necessary for the development of its mediating function. In addition, Jensen (1966) has hypothesized that an "arousal threshold" of mediating responses exists which concerns the tendency for particular stimuli to elicit verbal behaviour. This threshold is seen as being "directly related to the amount of practice in, and reinforcement of, verbal learning behavior and other forms of verbal coping with the environment (Jensen, 1966; p. 104)."

An important element in the study of mediating responses would appear to be the S's familiarity with the stimuli expected to elicit the mediating responses. It would be expected that familiar stimuli would more likely have a hierarchy of mediating responses available than would unfamiliar stimuli (Osgood, 1964). Some research findings in this direction have been indicated. For example, Sigel and McBane (1966) found that lower-class children had difficulty in classifying two-dimensional representations, even full-sized photographs of objects, despite consistent success in classifying the objects themselves. The introduction of familiar objects in tasks calling for mediational responses would provide important comparisons with performance on tasks using less familiar, two-dimensional figures. It would be expected that Indian children would more readily have available mediating responses for objects which are familiar to them and with which they have had experience in labelling.

The investigation of mediating responses has recently been conducted on the basis of performance of Ss on reversal and nonreversal shift tasks (Buss, 1953; Harrow & Friedman, 1958; Kendler, *et al.*, 1959, 1962, 1966; and Sanders, Ross & Heal, 1965). Here the S is required to discriminate initially between stimuli which differ simultaneously along two

dimensions. Once this initial discrimination has been learned, the S is required to shift his manner of responding. In the reversal shift, the same dimension is maintained but the choice must be reversed. In the nonreversal shift, the S must choose a stimulus from the previously irrelevant dimension. A simple example would be a task involving cups of two sizes, large and small, simultaneously varying on the dimension of brightness, white and black. The S would be required to select the larger cup of two presented him, regardless of whether it was white or black. A reversal shift would require him to respond to the small cup, that is, to reverse his initial response. A nonreversal shift would involve drawing the positive instance from the previously irrelevant dimension (e.g., the black cup). Kendler and Kendler (1962) suggest that if mediating responses are available, the reversal shift is easier since the same mediating response is appropriate and only the overt response must be changed. By comparison, nonreversal shift learning requires that both the mediating response and the overt response be changed since the initial dimension does not maintain its relevance.

A series of experiments by Harrow and Friedman (1958), Buss (1953), and Kendler and D'Amato (1955) indicated that college students execute a reversal shift more rapidly than a nonreversal shift. Experimentation with young children (Kendler and Kendler, 1959) showed that, when considered as a group, kindergarten children learn the two types of shift at approximately the same rate. When the children were considered as two groups, fast and slow learners, on the basis of initial discrimination learning, it was found that fast learners performed as predicted by mediational theory in that they found the reversal shift easier. Since the other groups found the nonreversal shift easier, it was assumed that they were operating in a nonmediational, single unit S-R manner.

The inferred developmental effect on the acquisition of mediational responses was studied by Kendler, Kendler, and Learnard (1962). The experimental procedure was changed to that of "optional reversal shift learning" which presented a choice of responding in either a reversal or nonreversal manner after initial discrimination learning. As hypothesized, the proportion of children who responded in a reversal manner increased with age. The percentage rose gradually from 37.5% at age three to 62.5% at age ten.

In the present study, the optional shift procedure was adopted to investigate the presence of mediational responses among Indian children. It was considered preferable to the older procedure, which compared number of errors in reversal and nonreversal shift tasks, since it examines the way in which S learns, rather than postulating the possible cause of failures. In addition, the optional procedure controls for confounding effects of partial reinforcement (Harrow and Friedman, 1958).

The primary purpose of the study was to examine the relationship between cultural difference and performance on reversal-nonreversal tasks as an indication of the development of mediational responses. More particularly, it attempted to investigate the responses of two culturally-different groups on two types of tasks, the first characterized by concrete familiar objects and the second by abstract pictorial stimuli. The performance of a sample of Indian children on the two types of discriminanda was compared with that of children from suburban middle-class homes. Since preference for the reversal shift is assumed to be associated with performing in a mediated fashion, it was anticipated that fewer Indian Ss would fall in this group because of their lack of verbal facility. Furthermore, it was anticipated that more Indian Ss would be reversers when concrete stimuli, rather than abstract forms, were presented as a result of greater familiarity with the actual objects.

Method

Subjects

The Ss were 80 school children drawn from two types of experiential backgrounds. Forty children were from suburban middle-class homes. Parental occupations of this group were generally in the professional and skilled trades areas. The other 40 Ss were drawn from three Indian reservations within the Edmonton Agency of the Department of Indian Affairs. The Indian population studied was judged by Indian Affairs personnel to be representative of the majority of Alberta Indians residing on reserves in terms of degree of acculturation, s-e-s, and educational level. Few parents had permanent employment; source of income was generally welfare payments or band funds from sale of mineral rights. The Indian students came in equal proportions from Cree and Stoney language backgrounds although in most cases parents spoke English as well. Ages of the children ranged from 8 years, 0 months to 8 years, 6 months, with mean ages of 99.9 and 99.3 months for the Indian and middle-class groups, respectively.

Apparatus

The apparatus for presentation of the abstract stimuli was similar to that described by Kendler, Kendler and Learnard (1962). Pairs of squares were presented on an apparatus that permitted the child to indicate his choice by pushing a lever, receiving a candy reward if he made the correct choice. The discriminanda consisted of four squares, differing in size and brightness, mounted in pairs on a mid-gray pasteboard card. Two squares were small (1 sq. in.) and two large (3 sq. in.); two were black and two white. The squares were paired in such a way that they varied simultaneously on the two dimensions. Thus, the small black was paired with the large white and the small white with the large black.

The apparatus for presentation of concrete objects consisted of a box, the face of which was 24″ x 18″, with an opening 12″ x 7½″ which was closed between trials by the lowering of a screen. Discriminanda consisted of four tin cans, judged to be familiar to all Indian children, which differed in size and brightness. Two cans were large (4″ tall x 2½″ diameter) and two were small (2¾″ tall x 2″ diameter). One can of each size had a black label; the other two had white labels. The cans were presented in a similar pairing to the squares so that members of each pair varied simultaneously on two dimensions. The cans were presented 6″ apart. A candy was placed under the correct can between trials.

Procedure

The Ss were drawn from the total within the school in the appropriate age group on a random basis with no attempt to match groups on variables other than sex. Equal numbers of boys and girls were placed within each of the comparison groups. Preliminary analysis of the data indicated, however, that no differences existed in the performance of boys and girls. To assure that no seriously retarded children were included, Bender's Visual Motor Gestalt Test was given. All children performed above the lower level of the average range as indicated by the Koppitz scoring method (Koppitz, 1964).

Each S was seen individually. He was seated at a table and told that he was to take part in some learning games, the first of which required him to copy some figures. The Bender-Gestalt Test was then administered according to standard instructions (Bender, 1946). Upon

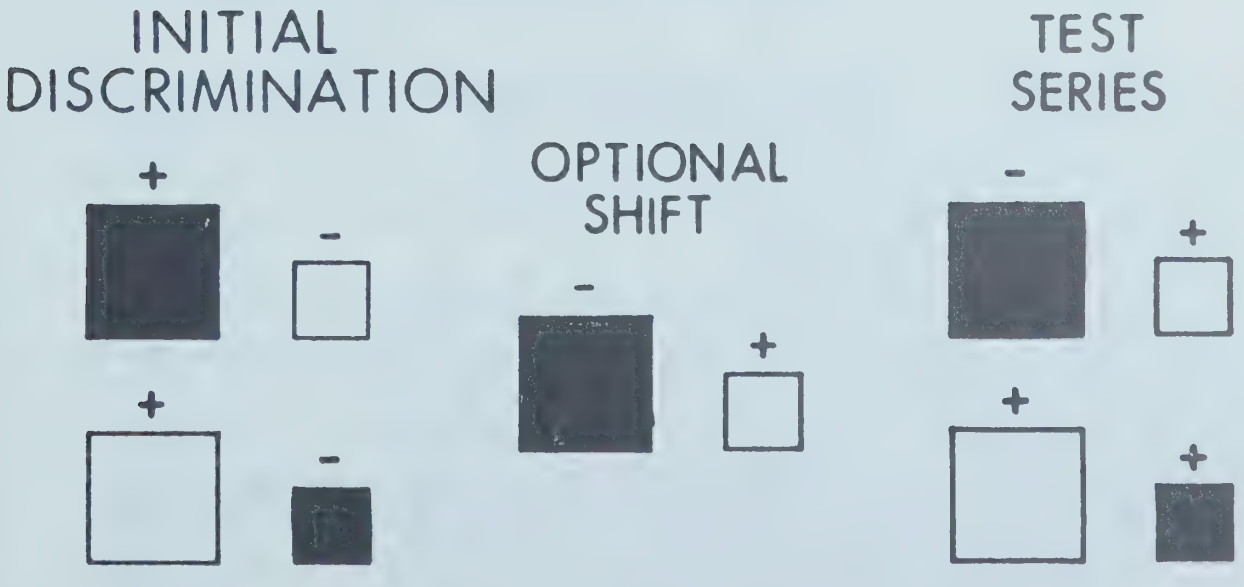

Fig. 1. Example of the abstract stimuli used and one of the reinforcement patterns.

the completion of the drawing task, S was told he was going to play another learning game and was conducted to a second table on which the mediation test apparatus was set out. Previously, Ss had been randomly assigned to discriminanda groups (concrete or abstract) and to initially relevant dimension groups (size or brightness).

The optional reversal shift procedure was similar to that described by Kendler and Kendler (1966). The test procedure consists of three stages as illustrated in Figure 1.

Stage I—Initial Discrimination: The pairs of discriminanda were presented alternately in a prearranged series so designed that: (*a*) each pair appeared equally often but no more than twice in succession, and (*b*) the correct stimulus appeared equally often on the left and right but no more than twice in succession in any one position. To discourage position habits, the stimuli were not changed until a correct response had been made. A response to one of the pairs was always correct and was rewarded with a candy. For half of the Ss, size was the relevant dimension; for the other half, brightness. Criterion for initial discrimination learning was 9 correct out of 10 consecutive responses, immediately following which the next stage was presented.

Stage II—Optional Shift: Only one of the stimulus pairs was presented and the previous reinforcement pattern was reversed. Both dimensions, size and brightness, were now relevant. Thus, in the illustrated example, S could learn the shift by responding to "small" or to "white" or to both indiscriminately. Criterion was again 9 correct out of 10 consecutive responses.

Stage III—Test Series: Immediately following the optional shift learning, both pairs were presented in the same prearranged order used in the initial stage. The pair not presented during the optional shift was considered as the "test pair." Responses to this pair determined the basis of response during the optional shift. Responses to *either* stimulus in the test pair were rewarded. The pattern of reward for the other pair followed that used during the optional shift to maintain the shifted response pattern. Each pair was presented 10 times in the alternating sequence used initially.

Following the 20 presentations in the test series, S was shown the "optional shift" pair and asked to explain which one was the "winner" in an attempt to learn more of the verbal process involved. At the end of each session, S was asked to keep information about the games secret until others had had their turns.

The accuracy of each response during the optional shift procedure was recorded. From the score sheet, number of trials during initial discrimination and optional shift trials were compiled for each S. On the basis of responses to the *test pair,* S was classified as a reverser if he made 8 or more responses in a manner opposite to the way he had responded during initial training (Kendler and Kendler, 1966). Nonreversers included all Ss who made 8 or more responses in the same manner as they had during initial training. All other Ss were considered as belonging to the inconsistent group.

The explanation provided by S regarding the "winner" was recorded verbatim for later classification into one of the following categories:

(a) verbalized correct dimension—responses to one or both of the dimensions which apparently guided S's responses in the optional shift and test series; (b) verbalized incorrect dimension—responses that were inconsistent with overt choice; (c) irrelevant—verbal explanations which did not mention either dimension on which the stimuli differed; (d) no verbalization.

The percentage of Ss within each of these four classifications was considered in terms of choice on the test series—reversal, nonreversal, and inconsistent.

Results and Discussion

Number of Reversers

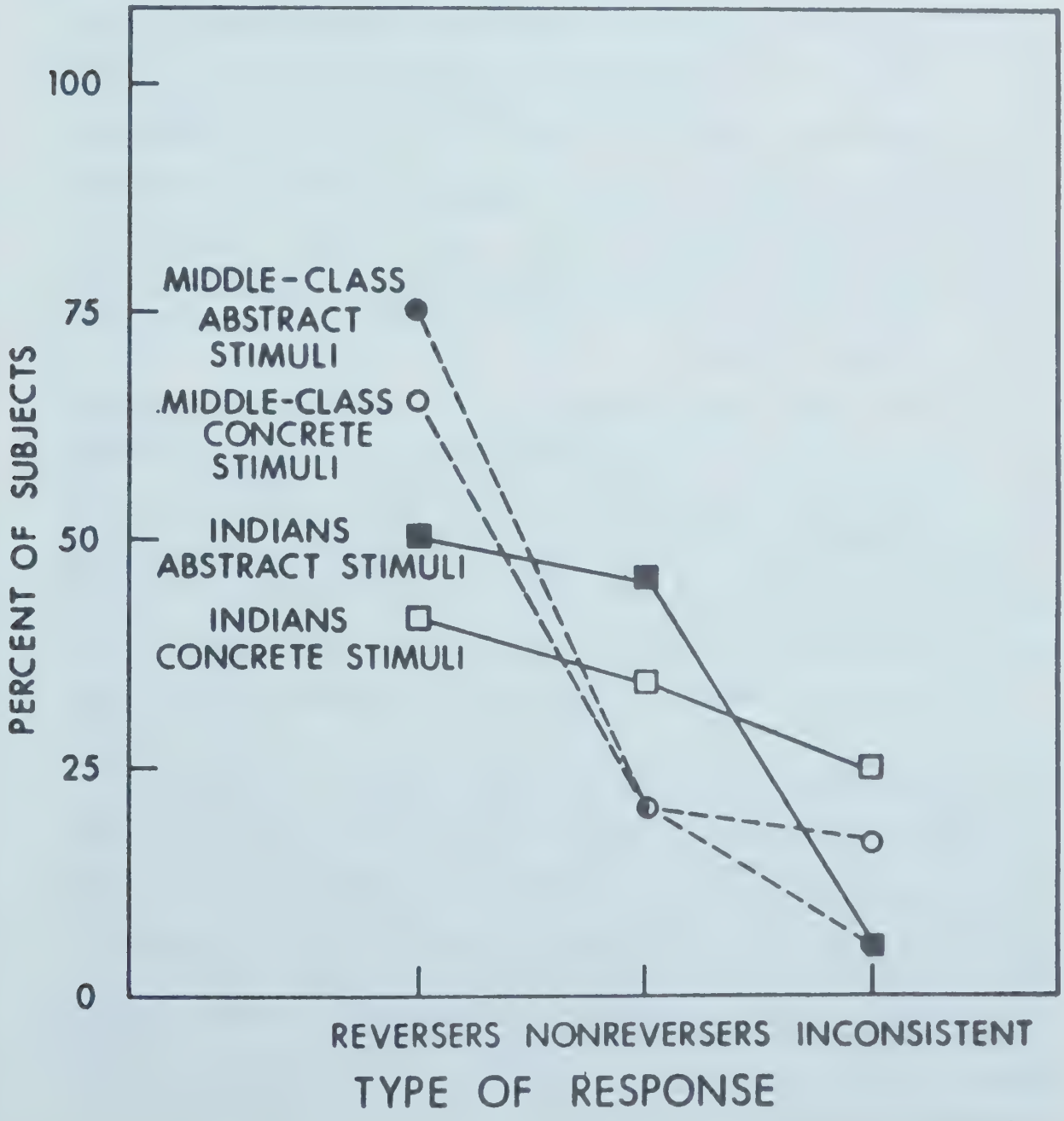

Fig. 2. Percent of subjects from each cultural group at each level of responding on test series.

As indicated in Figure 2, there was a consistent tendency for a lesser proportion of Indian Ss to respond in a reversal manner. Contrary to expectations, use of concrete stimuli did not lead to a greater number of reversers in the Indian group. Analysis of the relative influences of cultural group, type of discriminanda, and initially relevant dimension by multpile classification χ^2 (Sutcliffe, 1957) indicated that significantly more middle-class children (n=28) reversed as compared to Indian children (n=18). The obtained chi-square value for the cultural factor was 5.1 (df=1, $p<.025$). None of the associations with other factors nor interactions among factors was statistically significant.

The lack of significant association between type of discriminanda and number of reversers appears to be related to the disproportionate number of Ss responding inconsistently in tasks using concrete stimuli (Figure 2). It would serve to suggest that a certain amount of generality exists for the labelling of learners as reversers or nonreversers on the Kendler task. While it has been assumed that different types of discriminanda produce similar results in variations of the mediation test, for example Wolff (1967), no empirical support has been offered. In the present study, modifications in the procedure did not produce significant changes in the number of mediators in a group, at least as long as the stimulus values remained the same.

The lack of effect from changing the discriminanda is nevertheless surprising. It was assumed that Ss have had more experience in labelling and dealing with cans than squares. One possible explanation of the data would be that, because the cans were actually handled, size would become a predominant dimension and would interfere with learning the dimension of brightness and maintaining it during the shift learning. The results indicate, however, that the pattern for number of reversers on brightness and size dimensions is similar for the cans and the squares. A second explanation would return to Osgood's (1964) notion of a hierarchy of mediational responses being associated with a particular stimulus. It could be that, while mediational responses for brightness and size dimensions are associated with cans, other responses are more strongly associated and their elicitation interfered with performance in the present task. By contrast, mediational responses for brightness and size would be predominant for the squares. In partial support of this interference explanation is the disproportionately large number of Ss in both groups who responded in an inconsistent manner on the test series with the cans (Figure 2). An improvement in the procedure would be effected by selecting materials which differentiate between Indian and middle-class groups on the extent to which they elicit appropriate verbal responses.

Verbalizations

The Ss explanations of choice of winning can or square are reported in Table 1. An interesting result, in view of the commonly-held impression of Indian children as being reticent with adults, was that Indian Ss did not show withdrawal from verbal expression in this task. It was necessary, however, to add the question, "Which is the *good* one," when little response was made to the initial question about "winners." This extended questioning was required for about one-half the Indian Ss. Middle-class Ss showed a marked tendency to elaborate spontaneously upon their answer, e.g., ". . . the white one. At first, the black one was right but then it switched."

TABLE 1

PERCENTAGE OF SUBJECT'S GIVING TYPES OF VERBAL EXPLANATIONS AS A FUNCTION OF THEIR CHOICE ON THE TEST SERIES

			Verbalization			
Choice	Group	n	Correct	Incorrect	None	Irrelevant
Reversal	Middle-class	28	85.7	14.3	----	----
	Indian	18	77.7	16.7	----	5.6
Nonreversal	Middle-class	8	75.0	----	25.0	----
	Indian	16	63.0	37.0	----	----
Total	Middle-class	36	83.3	11.1	5.6	----
	Indian	34	70.6	26.5	----	2.9

Note--Inconsistent responses were given by 4 middle-class and 6 Indian children.

The majority of reversers in both the middle-class and Indian groups made correct verbalizations. Total number giving correct verbalizations was greater for middle-class children than Indian, but the difference was not statistically significant (χ^2=3.05, df=3, N.S.). A lesser number of nonreversers correctly explained their choice behaviour in both the cultural groups, with a somewhat greater proportion of middle-class than Indian Ss falling in this category. Interestingly, the nonreversers in the middle-class group who could not give correct explanations all fell within the "none" category. The similar group of Indian Ss all gave incorrect explanations. All Ss in both cultural groups who were in the in-

consistent choice group were able to give explanations. Since no dimension was consistently employed in their choice behaviour, it was impossible to classify these verbalizations as being correct or incorrect.

Comparisons of verbal explanations of choice behaviour would appear to provide important information about the relationships among overt language, test performance, and cultural group. It is significant that, despite general reticence to verbalize, Indian Ss did provide verbal explanations of their choice in this procedure (Table 1). Middle-class Ss tended to explain their behaviour more accurately than Indian Ss. An important finding to consider is the verbalizations of Indian Ss who were classified as nonreversers. When they were asked to explain which was the winner following the task, this group behaved in an almost random manner. The middle-class group of nonreversers did not show a similar tendency. The discrepancy would suggest that Indian Ss, particularly the nonmediators, do not have the same tendency to use verbal labels with non-verbal stimuli as compared to urban middle-class Ss in agreement with the higher arousal threshold hypothesized by Jensen (1966).

Number of Trials to Criterion

The relationship between reversal preference and speed of learning suggested by Kendler *et al.* (1962) leads to the expectation that fewer trials to criterion would be found for the reversal group. Similarly, as-

TABLE 2

NUMBER OF TRIALS TO CRITERION FOR INITIAL AND OPTIONAL SHIFT STAGES

		Initial Discrimination			Optional Shift		
Choice	n	Mean	Median	Range	Mean	Median	Range
Indian							
Reversal	18	23.7	15.5	9-102	13.1	11.0	10-24
Nonreversal	16	21.1	17.5	10-56	14.4	14.0	11-20
Inconsistent	6	15.2	15.0	10-21	13.5	13.5	11-16
Middle-class							
Reversal	28	23.3	14.5	9-119	15.2	12.0	10-35
Nonreversal	8	23.4	16.0	10-51	13.3	12.5	10-20
Inconsistent	4	18.2	12.0	10-39	15.7	11.5	10-30

suming that children from advantaged cultural backgrounds are more likely to have relevant mediating responses available, one would expect that fewer trials to criterion would be needed by the middle-class group.

The number of trials required by reversers to reach criterion was found to be essentially the same as the number required by Ss in nonreversal and inconsistent groups (Table 2). And there was no association between speed of learning and cultural group. These results are dissonant with those reported by Kendler, *et al.*, but closer examination of their results reveals that in the earlier study totals across five age levels, 3½ to 10½ years, were compared. Since the greater proportion of the nonreversal group would have been drawn from the younger age groups, the effects of nonmediating and age on the speed of learning were confounded. From the findings of the present study, it would appear that the error score was related more strongly to the age factor.

The lack of relationship between speed of learning and type of choice behaviour is not particularly surprising in view of the specific nature of the task and the small number of average errors to criterion. Mediating responses which facilitate learning are more important in complex tasks, and in tasks not as similar to original learning as the optional shift phase of the present study. The problem of finding appropriate tasks to test the hypothesized advantage of being a mediator appears to be an important one. A recent study (Wolff, 1967) did compare performance of mediators and nonmediators, as determined by the Kendler procedure, on another task supposedly calling for mediation, but few guidelines exist for choosing a concurrent task that would be appropriate. Kendler *et al.* (1962) found an association between speed of learning and reversal choice; however, their design confounded age and choice behavior. Buss (1953) did not find any relationship in his study which used one age group of Ss, college-level students. In the present study, reversal Ss learned faster on the optional shift than on initial discrimination, but so did all other Ss. This comparison, although reported by Buss and Kendler *et al.*, is difficult to interpret since the optional shift stage employs only one pair in contrast to the two pairs used in the initial discrimination.

To sum, it appears that Indian children of this age do not reverse to the same extent as middle-class children. Substitution of the supposedly more familiar and concrete stimulus material did not lead to increased reversal choice for this group.

Reversal response has been used as an index of verbal mediation. An additional contributing factor to the Indians' lack of reversing could be inappropriate attentional responses (Fellows, 1968; Kendler, Glucksberg, and Kenton, 1961; McConnell, 1964) to the important dimensional cues of the problem.

The results indicate that the general approach employed can lead to valuable observations about a group of culturally-different children.

The shift procedure did not meet with resistance on the part of any S and has the advantage of being couched in a meaningful framework so that results suggest important descriptions of intellectual development. The procedure's lack of emphasis on verbal expressive ability was a particular advantage for the study of Indian children. Additional investigation of this deficit in covert language among Indian children, examining the differential behaviour of mediators and nonmediators on other tasks, is needed.

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This comparative study used as its subjects two matched groups of Grades XI Social Studies 20 students. The experimental subjects had repeated the Social Studies 10 course, the control subjects had not. Although both groups obtained the same mean achievement score in Social Studies 10 the control subjects earned a significantly higher score than did the experimental group in Social Studies 20.

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What Profit Failure

The problem investigated by the present study is but another aspect of the enquiry into the merits of failing grades undertaken by Storey and Desson (1966) wherein it was suggested that when a teacher is asked why a given student failed a certain course the responses were to the efefct that: (*a*) he did not earn enough marks to pass, (*b*) he was not ready for more advanced work, and/or (*c*) he did not put forth enough effort to warrant a passing grade.

The Storey-Desson Study investigated the third of these contentions in that it tested the motivational value of low grades to discover that artificially bonused marks had greater motivational effect. It would seem to follow, then, that if a student is failing through lack of effort an inefficient method of increasing this effort is the awarding of low grades.

The issue as to whether or not a given student earned enough marks to warrant a passing grade is a nebulous one owing to the nature and calibre of the tests used to assess achievement. Most of the achievement testing done, at least in the Alberta schools, is done with teacher-made tests and most teachers have had little or no training in test construction. As a result, the tests used are, for the most part, unsatisfactorily low in validity, reliability, and objectivity. Besides this, most of the instruments used to assess achievement in areas like social studies, the subject of concern here, have traditionally been of an essay type and hence notorious for their inadequacies both in general (Wood, 1961)

and on the Alberta scene (Storey, 1968). The reliability coefficient of teacher made essay type examinations usually approaches .50 while the standard deviation of the scores approximates 15 (Storey, 1968). Thus, the standard error of measurement ($\sigma e = s\sqrt{1-n}$) is about 10 rendering any achievement grade based on the test relatively meaningless. For example, if the earned score is 65, the true score lies somewhere between 35 and 95 if one wants to be 99% confident. That is, the student might be failing the course miserably or might be passing it with extremely high marks. The test just was not adequate to determine which. It follows, then, that any pass/fail decision based on the scores obtained through such tests is ludicrous.

No doubt it is partly the results of these inadequacies in teacher-made tests that lead Alberta's Department of Education to continue to exercise responsibility for achievement testing at the crucial grade IX and XII levels. In any case, when the average classroom teacher suggests that a student failed a given course because he did not earn enough marks to pass it he is on very unfirm ground.

The claim that students were failed in a certain course because they were not yet ready for more advanced work seems more worthy of serious investigation. However, Cronbach (1963), in commenting on the findings of a number of studies on the results of repeating grades or courses, concludes that, although repeating work theoretically provides opportunity for mastery, in practice the repeater makes less progress than the student who does not repeat. The major purpose of the present study, then, is to test the supposition that students who repeat Social Studies 10 will achieve better in Social Studies 20 than do their peers who have not repeated Social Studies 10.

Subjects

In order to obtain a sufficiently large number of Grade XI students who had repeated Social Studies 10 together with matches for them, the three lowest achieving classes in each of three randomly selected Calgary high schools were used as subjects. In December each of the resultant 242 students was given a fifty item multiple choice test covering the just completed units, Units I and II, of the Social Studies 20 course. This test, constructed by four Social Studies 20 teachers with training and experience in test construction, was item-analyzed and re-scored on the basis of its best 40 items. The minimum criteria for item retention were a discrimination index at or above .35, a difficulty index between .30 and .80, and all item distractors working. The split half reliability coefficient for the forty item test, when corrected for length was .91, the S. D. 10.79 making the standard error 3.24.

Following the administration and scoring of this test all of the subjects in the sample who had repeated Social Studies 10 were identified and

matched as nearly as possible for age, Otis I. Q., sex, and Social Studies 10 final marks, with students who had not repeated Social Studies 10. The subjects who had repeated Social Studies 10 are hereafter referred to as the experimental group while their matched peers who had not repeated it are called the control group. Table 1 summarizes the results of this matching procedure. For convenience the results obtained from the Social Studies 20 test are also included in this table. All achievement marks are given in percentages. It is to be noted that the mean age of the experimental subjects is approximately one year greater than that of the control subjects.

Treatment of Data and Conclusion

Means and standard deviations were calculated for the total group and for males and females. These data are reported in Table 1. The differences of the means were analyzed using t tests of significance and the results are reported in Table 2.

TABLE 1

COMPOSITION AND ACHIEVEMENT OF CONTROL AND EXPERIMENTAL GROUPS

Control					Experimental				
Girls									
Subject	Age	I. Q. (Otis)	S.S. 10	S.S. 20	Subject	Age	I. Q. (Otis)	S.S. 10	S.S. 20
1	16-10	104	40	55	1	18-4	103	50	65
2	16-0	107	50	65	2	16-3	104	40	43
3	15-11	105	40	58	3	16-10	106	40	43
4	16-1	113	50	66	4	16-11	110	40	38
5	16-3	101	40	55	5	16-8	103	40	38
6	16-4	99	50	60	6	17-5	92	45	18
7	16-4	107	45	53	7	17-4	111	40	50
8	17-4	96	40	50	8	18-5	106	55	35
9	16-2	112	50	40	9	16-3	104	40	48
10	16-3	105	40	40	10	16-10	106	40	33
11	16-8	120	50	80	11	17-9	111	55	45
12	16-1	105	45	40	12	17-3	116	50	40
13	16-2	107	45	40	13	17-2	108	40	63
14	16-8	100	40	43	14	17-11	111	50	48
15	16-8	119	45	50	15	17-9	119	55	65
$\bar{X}$	16-5	106.67	46.67	54.33	$\bar{X}$	17-3	107.33	45.67	44.80
SD		5.48	4.25	11.84	SD		6.00	6.55	12.25

TABLE 1 (cont'd)

Boys

1	16-8	90	40	40	1	18-4	100	40	48
2	16-7	96	50	55	2	17-9	93	45	50
3	16-6	105	45	60	3	18-3	102	50	60
4	16-5	101	50	55	4	18-0	109	55	50
5	16-10	108	40	55	5	18-0	112	45	58
6	16-8	109	50	60	6	18-7	103	45	20
7	16-7	123	40	60	7	19-0	115	50	45
8	16-2	125	50	50	8	17-1	127	45	60
9	16-1	116	45	65	9	17-1	112	45	55
10	16-5	112	45	60	10	17-10	112	55	50
11	16-5	100	45	60	11	16-10	103	45	38
12	16-2	108	45	60	12	17-2	105	55	58
13	16-7	104	40	55	13	17-11	107	45	60
14	16-1	108	45	58	17	17-0	106	45	48
15	16-4	109	40	60	15	17-0	107	40	55
16	16-7	108	50	85	16	18-0	98	50	45
17	16-4	119	45	58	17	17-7	114	40	58
18	16-10	108	45	55	18	17-3	103	45	28
19	16-9	112	40	45	19	18-1	115	50	43
20	16-11	103	45	48	20	17-9	96	45	58
$\bar{X}$	16-8	108.20	46.75	58.75	$\bar{X}$	17-9	106.95	48.75	49.35
SD		7.75	3.80	9.22	SD		7.68	4.67	10.55
Total									
$\bar{X}$	16-7	107.54	46.71	56.85	$\bar{X}$	17-6	107.11	47.00	47.40
SD		7.31	4.00	10.53	SD		7.12	5.61	11.55

An examination of the data provided in Table 2 indicates that:

1. the total experimental and control groups and the sub-groups were not significantly different in ability as measured by the Otis intelligence test nor in Social Studies 10 achievement as measured by the final grades awarded by the various Calgary high schools.
2. both of the sub-control groups and the control group as a whole scored significantly higher on the Social Studies 20 test than did their experimental counterparts.

Within the limits of the current study, then, it becomes necessary to reject the hypothesis that repeating Grade X Social Studies will prepare students better for Social Studies 20.

TABLE 2

RESULTS OF T TESTS OF DIFFERENCES OF MEAN SCORES OBTAINED BY TOTAL EXPERIMENTAL AND CONTROL GROUPS AND BY MALE AND FEMALE SUB-GROUPS

	I. Q.		S.S. 10		S.S. 20	
Group	t	p[a]	t	p	t	p
Male	0.072	NS	1.900	NS	4.240	**
Female	0.410	NS	0.690	NS	3.060	**
Total	0.250	NS	0.250	NS	5.060	**

[a]NS= non-significant

* = $p<.05$

**= $p<.01$

Discussion

It is possible to debate the conclusion reached through the current study by arguing that the two groups studied were not in fact equal. Such a contention seems weak however in the face of the general rigour and control exercised through the design of the study together with the equality in Otis I. Q. scores. It is also weak when one considers that the experimental group's mean age was approximately one year greater than that of the controls and that due to school attendance regulations, this year must have been spent in school. Also, this differential age factor coupled with equivalent intelligence scores, would suggest greater maturity and experience on the part of the experimental subjects. It would seem, then, that, since the experimental group was older, had been longer in school, was equal in intelligence to the control group, and had had one school year longer in social studies, any advantages inherent in repetition had been more than counteracted through loss in motivational factors.

What profit failure, then? On the credit side, repetition may have been responsible for getting these subjects through Social Studies 10, but whether or not repetition increased their knowledge of this course material is in doubt in that any increase in marks obtained in the repetition year may have been due to the inadequacies of the tests used to assess it. Or, it may have been due to a "policy" of not failing a student twice in the same course.

The least that can be said on the debit side of failure is that, insofar as the present study could determine, it did not prepare these subjects better for new work. Indeed they achieved more poorly in Social Studies 20 than did their peers who were not required to repeat Social Studies 10.

At worst many questions could be asked concerning the cost of failure and repetition. Any such list of questions might query the cost:

a. in teacher and student time,
b. in school facilities,
c. in student and perhaps teacher motivation,
d. in student dropouts (only 35/242 low achievers were repeaters suggesting that a disproportionate number of failures had quit school),
e. in student self-development and attitudes,
f. the cost due to possible error and injustice resulting from test inadequacies, and
g. the cost due to possible scapegoating (Repeaters averaged one year older than their non-repeater peers suggesting a history of failure. There were also 20 male failures as compared to 15 female in the present sample where the total number of females [133] was greater than the males [109]).

In any case, if repetition does not accomplish whatever it is that it set out to accomplish, and the present study is one of many supporting the hypothesis that it does not (Cronbach, 1963), perhaps a careful second thought should be given before any individual is required to repeat any school grade or course.

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A selection of achievement, intellective, and personality tests was administered to freshmen university students for the purpose of identifying variables related to first year success. Correlation and regression analyses were conducted on the resultant data. The results show high school average to be the best predictor while the other variables are shown to possess little predictive utility.

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Prediction of Academic Success for Freshman at the University of Calgary[1]

During registration week of the 1966-67 academic year, freshmen students at the University of Calgary were required to complete a battery of various achievement, intellectual, and personality scales. The students appeared for testing according to a schedule based upon the alphabetical order of their surnames. Consequently, six separate groups of students were tested at different sessions throughout the week. Each group was given a test battery of a somewhat different composition. The purpose of the testing program was to identify, where possible, any variables which might be related to freshman success. Because achievement and intellective tests have been shown (for example Brown and Dubois, 1964; Payne *et al.*, 1966) to account for only a small portion of the variance, the inclusion of several non-intellective tests was deemed desirable. In addition, some of the scales had never been previously used in a validity study of this kind.

Psychometric Instruments

The instruments used included both the well-known standardized tests and relatively untried research scales. A brief description of each will be given in this section.

1 A complete copy of this research is available from the authors.

Cooperative Academic Ability Test (CAAT)

This test is published by the Educational Testing Service (ETS) and is designed to obtain estimates of verbal and mathematical ability for advanced secondary school students. Each part contains fifty items with multiple choice answers for each. Time allowed is 20 minutes for each part. Correlations between CAAT scores and school achievement as reported in the manual tend to be about .50. In addition, correlations with intelligence tests are moderately high.

Cooperative English Test (CET)

This test, also designed and published by ETS, measures achievement in two general areas: written expression and reading. In effect, there are two tests which may be given independently. English expression breaks down into two scales, effectiveness and mechanics; reading comprehension also has two scales, vocabulary and reading. The latter reading comprehension scale has two subscales: level of comprehension and speed of comprehension. In this study three of the scales were used: (*a*) vocabulary, (*b*) level of comprehension, and (*c*) speed of comprehension. Many predictive validity studies are reported in the manual and the correlation of CET scores with various criteria of academic success yields coefficients ranging from .22 to .60, the median correlation being about .40.

The California Study Methods Survey (CSMS)

This is a self-report inventory, published by the California Test Bureau, designed to reveal the nature of the study methods and attitudes of the student. It consists of 150 standardized items which purport to reflect differences in study methods and attitudes between high achieving and low achieving students. The inventory yields four scores: (*a*) attitudes towards school (attitude), (*b*) mechanics of study 1 and 2, (*c*) planning and systems (p & s), and (*d*) verification. Only the first three scores were used in this study. The student responds "yes" or "no" to the items. Data reported in the manual indicate correlations between .32 to .57 between these scales and scholastic achievement.

Eysenck Personality Inventory (EPI)

This test (Eysenck and Eysenck, 1963) is designed to measure the personality factors introversion-extraversion (I-E), and neuroticism (N). The inventory yields a lie (L) scale which is response validity factor. There are a total of 57 items: 24 I-E items, 24 N items, and 9 L items. They are responded to by the student with "yes" or "no." No data are reported in the manual which would provide evidence of the relationship between the EPI scales and academic achievement.

Costello-Comrey Need Achievement Scales

These scales have not as yet been published and are still in an experimental form. Two scores are available which may be described as achievement via effort and achievement via the emulation of success. It has been suggested that the first scale is related to a need to do well, while the second implies a need to be successful with the added feature of fear of failure. High scores indicate a need to achieve. The effort scale is composed of 10 items while the emulation scale has 14 items. They are posed as questions and answered "yes" or "no" by the examinee.

Taylor Manifest Anxiety Scale

Though widely used, this scale (Taylor, 1953) has not been published. The scale was devised to test the hypothesis that increased drive tends to lower the efficiency of learning at all difficulty levels. The assumption is that high drive states manifest themselves as anxiety. Fifty items from the Minnesota Multiphasic Personality Inventory which purport to measure anxiety were selected. Items are answered "true" or "false" and a high score indicates high anxiety. Research has consistently shown that measures of anxiety correlate negatively with academic achievement. One such study (Kelly, Hunka, and Conklin, 1965) showed that two measures of anxiety correlated -.26 and -.11 with university average.

Internal-External Control of Reinforcement

This scale, designed by Rotter (1966), measures general expectancies in learning situations as to whether reward or success in situations is dependent upon the individual's behaviour or is controlled by external forces. The scale gives one score which is a measure of external choices. Each of the 23 items is a forced choice of two alternatives. Both theory and research with this scale would indicate that correlation with academic achievement should be negative and significant (Lefcourt, 1966).

Pittsburgh Scales of Social Extraversion-Introversion and Emotionality

This test (Bendig, 1962) was developed to provide more reliable measures of the second order factors of extraversion and emotionality. The two scales report measures of introversion-extraversion (I-E) within a social context and general emotionality (E). For most purposes the scales are equivalent to those of the Eysenck Personality Inventory. The emotionality scale consists of 30 items and the introversion-extraversion scale of 30 items. The examinee answers "true" or "false" to each item.

Procedure

As well as using measures obtained by administering the above tests, each student's high school average on the grade 12 departmental exa-

minations was obtained. Students were then followed up at the end of their first year at university and the relationships between all variables and the first year university average was studied. Complete data were available for 639 students. Initially, means, standard deviations, and intercorrelations were obtained for all variables for each of the six samples. Linear step-wise regression analyses were also computed. A step-wise method of analysis has the feature of selecting the best predictor, searching for the second best predictor, and so on. Beta weights, partial correlations, and multiple correlations with the criterion are available. In this study all variables, including the high school average, were classed as predictors while the criterion was first year university average.

TABLE 1

CORRELATIONS OF PREDICTOR VARIABLES WITH FIRST YEAR UNIVERSITY AVERAGE

PREDICTOR VARIABLES	1	2	3	4	5	6
High School Average	.34	.42	.49	.55	.52	.60
Bendig: Intro-Extra	.00	-.30	--	.16	-.11	--
: Emotionality	.02	.22	--	.18	.02	---
CAAT: Verbal	--	--	.11	.21	--	.22
: Math	--	--	.14	.08	--	.23
: Total	--	--	.14	.18	--	.29
CET: Vocabulary	.23	--	--	--	.45	--
: Level of Comprehension	.32	--	--	--	.57	--
: Speed of Comprehension	.36	--	--	--	.51	--
Costello-Comrey: Effort	.20	.18	.12	-.02	-.07	.02
: Emulation	-.13	.07	.22	-.12	-.04	.00
CSMS: Attitude	--	.06	--	.25	--	.31
: Mechanics 1	--	-.19	--	--	--	.18
: Mechanics 2	--	.04	--	.22	--	.07
: Planning & Systems	--	.01	--	.13	--	.22
: Total	--	.00	--	.18	--	.25
Eysenck: Intro-Extra	-.10	-.22	-.17	-.17	-.10	-.15
: Lie	-.11	.17	.00	-.01	-.02	.10
: Neuroticism	.05	.25	-.09	.17	.09	.09
Rotter: Internal-External	.04	-.01	-.07	-.09	.08	.00
Taylor: Manifest Anxiety	-.04	.23	--	.13	-.02	--
SAMPLE SIZE	129	95	135	106	105	69

Results

The correlation of each variable with first year university average, for each of the six samples, is reported in Table 1.

The results of the regression analyses reported in Table 2 include the predictor variable, its raw score beta weight, the constant of the equation, and the multiple correlation with the criterion.

TABLE 2

CONSTANTS, RAW SCORE BETA WEIGHTS AND MULTIPLE CORRELATION COEFFICIENTS OF VARIABLES PREDICTING FRESHMAN SUCCESS

PREDICTOR VARIABLES	FRESHMAN SAMPLES					
	1	2	3	4	5	6
High School Average	.201	.289	1.012	.751	.716	.890
Bendig: Intro-Extra	.211	-.284	--	--	-.121	--
: Emotionality	-.143	.291	--	--	--	--
CAAT: Verbal	--	--	-.194	.104	--	.297
: Math	--	--	--	-.102	--	--
: Total	--	--	--	--	--	-.168
CET: Vocabulary	.079	--	--	--	.533	--
: Level of Comprehension	.194	--	--	--	.082	--
: Speed of Comprehension	.161	--	--	--	--	--
Costello-Comrey: Effort	1.355	1.005	.704	.310	1.075	-.383
: Emulation	-.214	-.395	.998	-.892	--	--
CSMS: Attitude	--	-.360	--	.098	--	.363
: Mechanics 1	--	-1.917	--	--	--	-.285
: Mechanics 2	--	-.569	--	--	--	--
: Planning & Systems	--	--	--	-.464	--	.208
: Total	--	.630	--	.221	--	--
Eysenck: Intro-Extra	-.318	-.158	-.487	--	--	--
: Lie	-.758	--	-.552	-.779	-.377	.714
: Neuroticism	.309	.274	-.259	.554	--	--
Rotter: Internal-External	.232	.280	--	-.380	.430	.241
Taylor: Manifest Anxiety	-.056	.218	--	--	--	--
CONSTANT	25.092	38.024	-5.881	5.523	-6.652	-15.122
MULTIPLE R	.526	.677	.581	.635	.599	.685

The results of intercorrelation analysis indicate that the correlation of high school average and freshman success is consistently higher than the correlation of any other variable with the criterion. Correlation co-

efficients range from .34 to .60, the median being .49. The only other test which, when correlated with the criterion, produced correlations approaching those for high school average and academic success was the CET. These coefficients ranged from .23 to .57, the median being .41. In regression analysis it was found that although the CET correlated higher than all variables with success (except for high school average) it added nothing to the predictive efficiency because the CET did not offer any unique contribution after the contribution of high school average. Two other standardized tests, commonly used for predictive purposes, had very low correlations with the criterion. The CSMS scores and freshmen success scores correlated from .00 to .31, the median r being .15. The CAAT had measured correlations of .08 to .29, with a median of .18. The magnitude of these median correlation coefficients reflects little predictive utility of the instruments.

Regression analyses indicate that a student's high school average is the single best indicator in the present study. In five of the six samples its correlation with the criterion is the highest and its beta weight is consistently high and positive. Multiple correlations of the criterion with all predictors combined range from .53 to .69. The median R is .62. This R would account for approximately 38% of the variance between first year university average and a composite score of all predictors, which means approximately 62% of the variance would be attributable to accumulative error and other unknown factors.

Discussion

An attempt has been made to present the relationships between several intellective, non-intellective, and achievement oriented variables. In addition an attempt has been made to combine the variables in such a way as to predict most efficiently first year university average. Several points appear significant and are worthy of discussion.

Firstly, the correlations of the various variables with academic success at university are far below those reported in the manuals of these tests. Secondly, the predictive efficiency of all tests combined is of little practical utility. One reason for the low correlations could result from the low reliabilities of both predictor and criterion variables. It appears that after high school average is known little more is added to the effectiveness of the prediction of first year university average. For example, in Sample 6 the variance accounted for by high school average is about 36%. With the addition of eight variables the variance accounted for is about 48%, an addition of only 12%.

Examination of Table 2 reveals a disappointing though prescient fact. Many of the predictor variables fluctuate markedly in the magnitude of their relationship with the criterion. For example the CAAT Verbal score acts as a positive predictor within two samples, but as a

negative predictor within another. Such inconsistency is indicative of the distribution of the correlation coefficient for the predictor variable and as such is not totally unexpected. In any event it stands as a warning to minimize Type S errors (Lindquist, 1956) through careful subject randomization when conducting a study of this kind.

Table 2, Sample 6, shows the combination of predictors having the highest multiple correlation with the criterion. This sample also yielded the highest correlation between high school average and first year university average. By using only four variables from this sample a multiple correlation of .66 is obtained with the criterion. The variance accounted for is approximately 44%. The regression equation with the raw score beta weights of these four variables is as follows:

$y = -15.27 + .80\,x(1) + .92\,x(2) + .23\,x(3) + .17\,x(4)$ where
y = first year university average
$x(1)$ = high school average
$x(2)$ = Eysenck's Lie Scale
$x(3)$ = Attitude towards School (CSMS)
$x(4)$ = Verbal (CAAT)

Other lengthier equations can be obtained from Table 2, but the above equation was presented here because of its practical utility. That is, the tests in this equation can be administered in just over one hour making them more useful for educational counselling. It would seem desirable, too, that if tests are to be used for prediction purposes then regression equations like the one above should be employed. One should keep in mind, however, that there is a considerable amount of error involved in predicting scores when using such regression equations. On the basis of the present study prospects look dim for the usefulness of psychological tests in the prediction of freshman success at university.

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Techniques for directive counselling were developed on the basis of the Secord and Backman theory. This method of group counselling, when compared with a client-centered group counselling method, appeared more effective than the latter. Further experimentation with directive counselling seems justified on the basis of the findings.

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A Comparison of Client-Centered VS Directive Group Counselling with High School Students

A major goal of counselling is the bringing about of some desirable change of behaviour on the part of those individuals counselled. By and large it is the troubled or inept or disturbed or unsuccessful student in high school who receives counselling. If counselling is to achieve its goal the student should behave after counselling in some different way that enables him to deal more effectively with his problems and to be a happier or more effective individual.

The manner in which a counsellor undertakes to help students bring about in themselves whatever changes in their own behaviour or outlook are necessary will depend upon the counsellor's theoretical orientation. To put it another way, if the counsellor is going to do more than simply fumble around in the hope that whatever he does will somehow benefit the student, he must proceed according to some plan and have some reasons for believing that whatever he is doing will work to the student's benefit. Each counsellor then must seek to adopt or develop a theory which seems to him to provide a reasonable rationale for his counselling practices. This is not an easy matter, however; first, because there are many theories of personality among which to choose and, second, because even when an acceptable theory has been chosen it is not a simple matter to learn how to tailor one's practice to fit the theory.

Faced with these hard facts there is a great temptation simply to follow a counselling procedure developed by some other practitioner (in line, it is presumed, with that practitioner's own theoretical bias). Although this should at least lead to some consistency in approach and a degree of confidence in what one is doing, the danger is that it may lead to a complacent attitude which inhibits sufficient attention to a realistic assessment of what results are actually being achieved.

No matter how convincing his rationale, each counsellor needs to face questions such as these: What is the evidence in my own experience that seeing students individually is more effective than seeing them in groups or *vice versa?* What is the evidence that one should counsel exclusively on either an individual or a group basis or by means of a combination of the two? What is my own evidence that a troubled student who is counselled does better in the end than one who is not counselled? (The record of proven effectiveness of talking therapy where attempts at evaluation have been made is somewhat disquieting! [Eysenck, 1952; Bergin, 1963].) What is the evidence that the theoretical basis for my own counselling methods is broad enough to include all the factors which are crucial, that no important aspects of behaviour or interpersonal relations are being ignored?

With these questions in mind let us begin by searching for a theory of personality broad enough to include as many as possible of the factors which influence an individual's behaviour. If such a theory were broad enough to encompass other theories of personality and capable of explaining both stability and change in an individual's personality, perhaps it could form the basis for some useful guide lines in the counselling process. The search for such a theory was the beginning of the present study.

Secord and Backman (1964) presented a useful synthesis of several theories of personality in a study reported in the *Psychological Review.* These authors began by trying to develop a theory which could account for both stability and change in an individual's personality and they were concerned with an interaction process which is truly interpersonal, where neither the behaviour of the individual nor of the other is the sole locus of cause.

In developing these ideas the notions of "interpersonal matrix" and "matrix congruency" are postulated. According to this view, the locus of behavioural stability and behavioural change is said to lie in the interpersonal matrix which has three components: Self-Concept, Self-Behaviour, and Other-Behaviour. There will be many matrices in the conceptual system of the individual. Matrices may be congruent or incongruent. A congruent matrix is achieved when all three components stand in a supportive relationship, i.e., "when the behaviors of the S (Self) and O (Others) imply definitions of self congruent with relevant aspects

of the self-concept" (Secord and Backman, 1961, p. 23). This sets out a well-structured framework and a very significant aspect of the idea of the dynamic interaction between the components.

Each component acts upon the other and changes are brought about in the components as a result of this. For example, the Self-Concept component interacts with the Self-Behaviour component and either or both of these components may be changed as a result of this interaction. Similarly, an interaction takes place between the Self-Components on the one hand and perceived Other-Behaviour on the other hand. But Other-Behaviour is itself modifiable by this interaction process and in turn, in the modified form, may have a different effect on Self. (Secord and Backman [1961, pp. 23, 24, 26, 27] cite some specific examples to illustrate this principle.)

These observations may be made clearer if the process is represented diagrammatically (Figure 1).

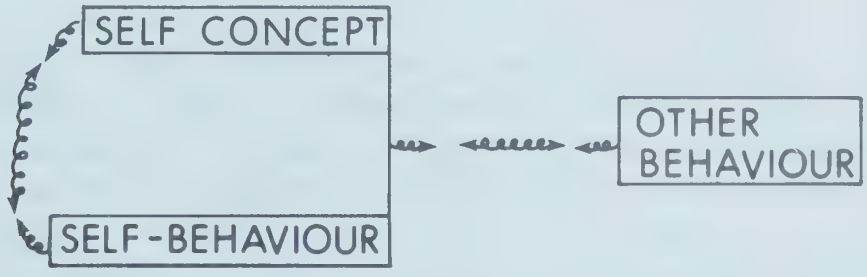

FIG. 1: A MATRIX IN THE PROCESS OF FORMATION

This diagram represents a matrix in the process of information where quite possibly one or more components are incongruent with the others. Since the tendency is always to seek congruency the interactions are probably bringing about changes in one or more of these components.

Eventually, at least in a relatively well-functioning individual, a state of congruency will likely be achieved. In its more stable form the personality matrix may now be represented as in Figure 2.

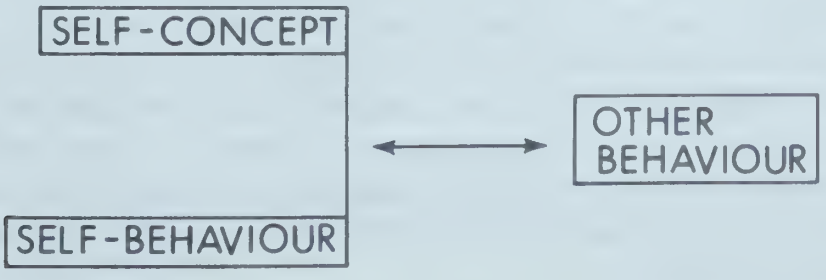

FIG. 2: REPRESENTATION OF CONGRUENT MATRIX

Here the arrows are smooth, representing a state of stability and smooth flow, but still double-headed to include the dynamic interaction factor

which is as essential a part of the matrix as any one of its components. As this situation occurs more and more often in more and more of the personality matrices or systems of matrices, the individual should function more and more smoothly and easily within his environment.

Looking at the structure of personality in this way, stability is seen not as something fixed or static in the usual sense, but as something depending upon a continuation of a smooth interaction process. A change, especially a sudden or marked change in any one component, could set the whole interaction chain within the matrix into oscillation. To restore a state of stability, changes may have to be made in one or both of the other components of the matrix. Thus, both stability and change are explainable in terms of this model. Furthermore, this point of view makes it possible to use many other theories of personality such as those developed by Harvey, Hunt and Schroder (1961), by Rogers (1951), by Festinger (1957), and by Kelley (1955) to explain, as it were, the working details of the processes indicated by the Secord and Backman model (Briggs, 1966).

If one can accept the point of view outlined above, then the next step is to consider the implications for counselling. If an individual is seriously disturbed or is functioning so poorly as to be seriously handicapped, the above point of view would lend one to conclude that he is finding himself unable to cope with the oscillations set up in the interaction process and is thereby unable to achieve sufficient congruency in the personality matrices. It may be assumed that extreme lack of congruency in many matrices would be very distressing.

In attempting to help such an individual the counsellor would need to keep in mind the triad of Self-Concept, Self-Behaviour, and Other-Behaviour and also the interaction among these three components. The aim of the counsellor would be to assist the counsellee to achieve a better measure of congruency in all three components, aware that he, the counsellor, is part of the client's Other-Component. The interaction process between the counsellor and the counsellee (which affects both of them) is one factor in achieving congruency. It may well be that the client needs to learn techniques that can be used to facilitate change in one or more of the components of the personality matrix. These techniques could very well include ways of influencing or changing others equally as much as techniques for changing his own Self-Concept or Self-Behaviour. Perhaps the counselling process should include some sort of "instruction" or "direction" with a view to helping the counsellee learn such techniques.

The Other-Component of the matrix may be very important, more so than many theories of personality seem to recognize. In any case there does not seem to be any reason to suppose that it is not equally important as the Self-Concept or Self-Behaviour components. If this is so, it is

possible that group counselling is much more necessary than has been realized. The individual counselling relationship may have very real limitations since the Other-Component is limited and rather drastically modified. It is possible that group counselling where more than one "other" is present in the therapeutic environment is a very necessary part of a properly balanced counselling procedure. This is in contrast to one widely followed counselling method (usually but not always carried out on an individual rather than group basis) which concentrates deliberately on Self-Concept.

In brief, the implications for counselling seem to be that while attentions to the Self-Concept of the individual should certainly be part of the counsellor's concern, he should not neglect or ignore the other components of the personality matrix nor should he ignore the interaction processes that seem to go on among the components. There is a suggestion that a necessary part of the counselling process may be a directive sort of relationship aimed at helping the counsellee to acquire techniques of handling the interaction processes so that he gains more facility in bringing about a congruent state among all three components of his personality matrices. Thus, group counselling in itself may not be sufficient since it is entirely possible to use a client-centered approach in a group situation where the chief concern is with the Self-Concept of the individuals within the group.

One might now hypothesize, in line with the Secord and Backman theory, that counselling which concerned itself with all three of the matrix components and also with the interaction process would be more effective than a purely client-centered approach which is preoccupied with the Self-Concept component. To test this out one might work with two groups in one of which a client-centered approach alone was used while with the other a directive approach fitting in with the Secord and Backman theory was used. This, in essence, is what was attempted in the present study in which three groups of troubled individuals were compared on the amount of improvement over a given period of time. Three treatments were compared: no counselling, group counselling by a client-centered method, and group counselling by a more directive method in which attention was given to all three components of the personality matrix and to the techniques of handling effectively the interaction processes. The specific hypotheses tested were:

1. The uncounselled group would show the no improvement.
2. The directed group would show more improvement than the client-centered group.

Fifty students in an urban high school were selected for study. For each student there appeared to be reasonably conclusive subjective evidence that he was experiencing more than usual difficulty in interpersonal relationships. From among these fifty students three groups of five

girls and three groups of six boys were chosen randomly. Each group in each sex category was then randomly designated either as control (no counselling), client-centered (that is, slated to receive client-centered counselling) or directed (that is, slated to receive directed counselling as described below). Before the counselling began, all students were asked to complete the I.P.A.T. Junior-Senior High School Personality Questionnaire (Cattell, 1962). At the conclusion of the experimental period the students were again asked to fill in the same questionnaire and a comparison of scores was made using t tests of the significance of differences between group means.

The control groups were not counselled. The client-centered groups (one group of boys and one group of girls) were counselled as a group for five sessions of thirty-five minutes duration not more than once a week over a period of eight weeks. The client-centered method of counselling is well-known to most counsellors and those not familiar with it can find many good descriptions of this method, notably Rogers (1951). The remaining groups were counselled for similar periods and the same number of times using a directed approach based on the Secord and Backman theory.

In the "directed" approach the total series of counselling sessions was deliberately planned and a "structure" was maintained by the counsellor who directed the attention of the counsellees to aspects of behaviour and of cognitive processes that were felt to be crucial in learning to build more congruent systems of personality. The chief concerns of the counsellor were these:

1. To see that a definite, pre-arranged progression was followed as the interview sessions went on so that each component of the matrix received attention.

2. To see that attention was paid to the techniques of dealing with the interaction processes since "According to the interpersonal congruency theory, the individual actively uses techniques or mechanisms for maintaining his interpersonal environment so as to maximize congruency" [Secord and Backman, p. 584]. The structure of this series of counselling sessions consisted of three phases.

Phase One: The Self-Concept

The aim of the early counselling sessions was to direct the attention of the individuals to their own Self-Concept in order to clarify it and make it as explicit as possible. The procedure was to help them reveal their own values and ideals, to struggle to reach tentative conclusions in areas of doubt, to accept differences in one another's ideas and ideals and to accept the idea that one's set of values is to some extent subject to change and modification as experiences accumulate.

Phase Two: The Self-Concept—Self-Behaviour Interaction

Here discussions were initiated on how to act in a manner consistent with one's own ideas of right and wrong, to identify sound bases on which to make such decisions, to decide what to do about errors and mistakes. The subject of semantics was brought in on a non-technical level using ideas by such writers as Johnson (1946); especially useful was Johnson's idea of the error of dichotomizing "success" and "failure."

Phase Three: The Dynamics of Self-Other Interaction

Here attention was directed to such matters as genuine consideration of others, selective interaction with others, empathy as a skill to develop, development of the ability to observe and really listen to others. It is not suggested that philosophical or technical discussions took place during this phase but relations with others were discussed in practical terms with a view to developing perception and a realistic appreciation of others.

A question will naturally arise as to whether or not the counsellor did indeed use two different and clearly distinguishable methods of counselling with the two experimental groups. To check this out, tapes were made of the first five counselling sessions for each of the client-centered and the directed groups. These ten tapes were then played in random order to a group of eight competent judges each of whom was asked to indicate independently which type of approach was used in each taped session. For all the directed sessions there was 100% agreement that this was the method used. For three of the client-centered sessions there was 100% agreement that this method was used while for the remaining two 75% of the judges agreed that this was the method being used.

The results of the analysis of the change between first and second scores on sub-tests of the I.P.A.T. Questionnaire were compared. Statistically significant differences were found for only four sub-tests: E—submissive vs dominance, G—weak vs strong superego strength, J—given to group action vs obstructive individualism, and O—self-assured, placid vs apprehensive, worrying. These results are reported in Table 1.

An examination of the data gives some support to the following statements:

1. The only significant change noted for the uncounselled groups was in the direction of increased worry and apprehension. This supports the first hypothesis that uncounselled groups would show no improvement.

2. One client-centered group showed a significant change in the direction of dominance as opposed to submissiveness. Trends were also noted among the client-centered groups indicating an increase in sen-

TABLE 1

SIGNIFICANT CHANGES BETWEEN FIRST AND SECOND TESTINGS[a]

Factor	Uncounselled	Client-Centered	Directed
E		girls (.025)	boys (.025)
G			boys (.10)
J			girls (.10)
O	boys (.10)		

[a]Probability given in parentheses.

sitivity, an increase in self-assurance and a decrease in worry and apprehension. This gives a degree of support to the hypothesis that client-centered counselling would result in some improvement.

3. One directed group showed a significant increase in dominance as opposed to submissiveness and also a significant trend toward being less rule-bound. Another directed group showed a significant change toward more ready acceptance of group action as opposed to obstructive individualism. A trend was noted in these groups toward increased self-concept control and self-discipline. These findings lend some support to the hypothesis that directed counselling would bring about the most improvement.

It seems worthwhile to note the following trends even though they cannot form the basis for any firm conclusions because significance of difference was not obtained. There was a consistent trend in the results obtained on second testing, compared to the first test scores, which seemed to indicate that directed counselling may be more effective than client-centered counselling in increasing self-concept control and self-discipline. Client-centered counselling seemed to have little positive effect here and may even have had an inhibiting effect since both control (uncounselled) groups made more gains on this factor than the client-centered groups. It might be conjectured, though it was by no means proven, that attention to the techniques of bringing about congruence in the total personality matrix (which was attempted with the directed groups) may have resulted in more successful control of self-concept and self-behaviour. Such a result if it can be established in subsequent experimentation would be consistent with the Secord and Backman theory.

In conclusion it must be said that the significant results were too few to allow any categorical statement as to the superiority of one counselling method over the other. In general there was some vindication of group counselling *per se* inasmuch as the uncounselled groups not only showed no significant improvement but in one instance showed significant regression.

In vindication of directed counselling based upon the Secord and Backman theory, one can say that it appeared to be at least as effective as client-centered counselling and may have been somewhat superior in the beneficial results obtained. There was at least sufficient evidence to justify further experimentation with this type of counselling. Perhaps the evidence will be thought sufficient to encourage other counsellors to familiarize themselves with the Secord and Backman theory and to carry on further experimentation along the lines suggested here. If there is even a reasonable possibility that a directed counselling procedure based upon this theory could provide more help per counselling hour for our high school students, it is worth further investigation. In the uncertain state of psychotherapy today, any new procedure which offers hope for improvement ought not to be ignored.

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There is a close relationship between social class and membership on the high school student council. Council members come from a higher social class. They are also more active in extra-curricular activities, but not necessarily sports activities. These same students feel more politically efficacious in the area of student decision-making, and hold a higher sense of citizen duty toward student elections.

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Students' Council Leadership

Every high school will have a unique set of aims for the students' council and its system of student government. However, it is generally agreed that the program of student government must contribute to the effectiveness of the school. Both the school and the individual must profit by the activities resulting from the students' council program. According to Van Pool (1964), the single most important objective is that of "teaching habits of responsible citizenship." By examining a number of factors which may be associated with council leadership, this study (MacLeod, 1966) sought to determine whether the aim of responsible citizenship and other commonly accepted aims of student government are being realized.

Theoretical Framework

An initial factor important in determining who will be elected to the student council is the presence or absence of school regulations which restrict membership for some or all of the offices. Knill (1963) found that:

> The relationship between grade level and the proportion of students holding elected positions is something that is built into the system by tradition (i.e. students in the lower grades are not expected to be candidates for as

> many offices as are the senior students) or by rules and administrative control (i.e. students in the lower grades are not permitted to run for top positions in the council) [p. 61].

There have been a number of studies in the area of extracurricular activities, and to a greater extent in the social sciences, that suggest the importance of three variables in determining who holds office: social class, attitudes toward the political process, and membership in voluntary organizations.

Hollingshead's (1949) study of *Elmtown's Youth,* tested the hypothesis that "The social behavior of adolescents is related functionally to the positions their families occupy in the social structure of the community [p. 9]." An examination of the Elmtown students' union revealed that students from the upper classes were disproportionately represented on council while the lower class students did not elect as many representatives as their numbers in the student body warranted.

The general area of attitudes toward the political process has been studied by Campbell (1952) and Presthus (1964) while Ziblatt (1965) and Knill (1963) examined students' attitudes toward politics. Knill used a modification of Campbell's Political Efficacy Scale and Sense of Citizen Duty Scale to obtain student evaluation of the council as an agent for their political welfare, of themselves as effective agents in council affairs, and of themselves in the role of voters. He found that girls felt more efficacious than boys as voters in student council elections and that students felt increasingly more efficacious as they progressed to the higher grades.

The relationship between membership on the student council and participation in voluntary organizations was found to be consistent with the findings of Presthus (1964). For the communities of "Edgewood" and "Riverview" a pronounced relationship between class status and membership in voluntary organizations was noted. This was the same in the ten high schools studied by Knill (1963).

Research Design

The study was designed to determine whether selected variables are related to the election of an individual to a students' council. The sample surveyed consisted of the grade ten, eleven, and twelve students in attendance during the 1965-66 school year in the Grande Prairie School District. Data gathered by questionnaire were used to examine the social class of council and non-council students, to ascertain the extent to which members of the student council participate in extra-curricular activities as compared with the overall student population, and, finally, to compare the attitudes of council members toward the political process, as reflected in student government, with that of the other students.

The instrument used in collecting the data was devised especially for this investigation. The first section of the questionnaire consisted of items designed to measure student attitudes toward the political process. Questions taken from Campbell's study of voting were modified for administration to high school students. The Guttman technique for scalogram analysis was used to determine whether the items formed a unidimensional scale. When items scale, the scale score an individual is assigned provides a description of his attitude with respect to each of the scale items. Further, as persons obtaining the same score have responded similarly, then they can be expected to be similar in the characteristics which the responses might represent. A second section of the questionnaire elicited demographic and general information such as age, grade, sex, council membership, membership in voluntary organizations, and occupation of the father. In subsequent analysis the Blishen Scale (1958) was used to translate the father's occupation into a social class category.

Results

The first hypothesis tested was that the social class of student council members would be higher than that of non-members. Social class was determined by father's occupation according to the Blishen Scale. The resulting frequency distribution is presented in Table 1. Means and standard deviations were computed for social classes of council and non-council members. A "t" test of the significance of the difference of means between the two groups indicated a "t" significant at the .0001 level (two tailed). As might be expected, the application of a Mann-Whitney "U" test to the same data resulted in a "U" significant at the .0002 level (two tailed). The above results strongly support the first hypothesis that Council and Non-Council Members differ in social class, and an inspection of the means indicates that the difference favours Council Members (see Table 2).

The second hypothesis stated that "council members express a more favorable attitude toward the political process as tested by the scale of political efficacy, the scale of sense of citizen duty and the scale of contempt for people." The students responded to the following forced —choice statements:

Political Efficacy Scale:

Voting is the only way that students like me can have any say about how the students' council runs things.

Sometimes students' council activities and business seem so complicated that a student like me can't really understand what's going on.

Students like me don't have any say about what the students' council does.

I don't think student council members care much what the students like me think.

TABLE 1

FREQUENCY DISTRIBUTION OF SOCIAL CLASS

BY COUNCIL MEMBERSHIP

	Social Class Category							
Council Membership	1	2	3	4	5	6	7	Total
Member	1	20	4	3	7	7	1	43
Non-Member	15	39	26	15	131	48	29	303
Total	16	59	30	18	138	55	30	346

TABLE 2

TEST OF SIGNIFICANCE OF THE DIFFERENCES BETWEEN SOCIAL

CLASS MEANS OF COUNCIL AND NON-COUNCIL MEMBERS

	Mean	Standard Deviation	t
Council Members	3.47	1.70	4.03*
Non-Council Members	4.55	1.64	

* Significant $p < .0001$

Sense of Citizen Duty Scale:

So many other students vote in the students' council elections that it doesn't matter much to me whether I vote or not.

It isn't so important to vote when you know your candidate doesn't have any chance to win in the students' council election.

A good many students' council elections aren't important enough to bother with.

If a person doesn't care how an election comes out he shouldn't vote in it.

The Political Efficacy Scale produced a coefficient of reproducibility of 92.8, and the Sense of Citizen Duty Scale produced a coefficient of reproducibility of 94.2, both above the criterion level of 90.0. Differences in scale scores were all in the hypothesized direction, but only the Political Efficacy Scale differentiated strongly between council and non-council members. Table 3 presents the results of Mann-Whitney "U" tests.

TABLE 3

MANN-WHITNEY "U" TESTS OF DIFFERENCES BETWEEN

COUNCIL AND NON-COUNCIL MEMBERS

Scale	U	Z	P
Political Efficacy	5338.0	-2.684	.0037
Sense of Citizen Duty	6820.5	-0.350	.3632

An item by item analysis of the scales was undertaken to obtain more detailed information about student attitudes toward the political process. Utilizing both "t" tests and "U" tests it was found that the item which provided the greatest differentiation between the two groups was from the Political Efficacy Scale. This item, significant at the .0001 level, was "Students like me don't have any say about what the student council does." Attitudes were then examined for sex differences but of the twenty questions used to test attitudes only one reached significance at the .05 level.

The third hypothesis stated that "there is a greater proportion of council members who participate in voluntary organizations than there is of non-members." Three questions were designed to test this hypothesis and two further items considered the relation between executive membership in voluntary organizations other than the student council and council membership.

Students were classified by council membership and by participation in extracurricular activities. A chi-square test showed significance at the .01 level indicating that a significantly greater proportion of council members were participants in extracurricular activities than was the case for non-members. A subsidiary hypothesis to the effect that council members are those who participate in three or more extracurricular activities was supported by a chi-square test (significant at .01 level).

One might expect that there would be more executive members of clubs, both within the school and outside the school, that would be council members than would be the case for the rest of the student group. However, there was little relation between non-school executive membership and council membership. A chi-square test produced a result that could be expected to occur by chance more than fifty times out of a hundred. In the case of school clubs over one-half the council members were on club executives while only one-seventh of the non-council students held such positions. This relationship was statistically significant at the .001 level.

Finally, the common view that the student who participates in inter-school sports will be elected to a council position was not strongly supported. There were about 10 chances in 100 that the obtained chi-square could have been obtained by chance.

Implications

There is a need for research on students' councils that is based on theories which are not merely statements of what some individual believes ought to be, but rather are descriptive theories which can give rise to empirical predictions that can be confirmed in experience. Unfortunately, until educators feel a need to examine critically what they are accomplishing when they set up systems of student government, they will be prescribing functions which they desire but will remain oblivious to the actual functioning of the council as an institution furthering democratic principles. Thus, although many educators firmly state that students' councils are providing training for all students in the operation of democracy, in actuality, as was indicated in the present study, the council may be a narrowly constituted body which is not representative of the student body as a whole. The feeling of a large group of students that they cannot influence the political process may partially account for a feeling of apathy toward the council and its activities.

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BOOK REVIEW

CONCEPTUAL FOUNDATIONS OF SCIENTIFIC THOUGHT

By: Marx W. Wartofsky (New York: The Macmillan Company, 1968).

I find reviewing this recent contribution to the literature of philosophy and the philosophy of science a pleasure. In his preface the author stated that "the main emphasis throughout is on the philosophy of science as a philosophical discipline." This is an accurate description of the form and content of the book and consequently the chief reason for its being, in the opinion of this reviewer, a most significant contribution to the field. Wartofsky has achieved what most writers in the philosophy of science have failed to achieve. He has written a philosophical treatise in the context of science and scientific thought that is neither pseudo-philosophy nor pseudo-science. For this, he is to be congratulated and it may be said that he has contributed significantly to bringing the philosophy of science to philosophical maturity. It may be said too, and argued with vigour, that the book deserves to be classified as scientific epistemology rather than as philosophy of science. I doubt if Wartofsky would recognize or accept this distinction because the emphasis he displays shows that he may view philosophy of science and epistemology as synonymous fields. This is a view with which I would not wish to disagree, and the exemplification of which I find encouraging.

The book contains four parts, I "The Genesis of Scientific Thought," II "The Methods of Science," III "Some Fundamental Concepts in the Sciences," and, IV "Coda."

Only one chapter—"Science, Values, and the Humanistic Understanding"—is included in the final part. It is a short chapter and serves only to relate scientific inquiry to the humanistic domain. One could wish that the author had developed this dimension more fully, but as considerable attention is given to it incidentally throughout the book the brief note in the final chapter may be justified.

The book also contains four appendices including a short description of logical notation, which should prove very useful to the less philosophically sophisticated reader, and a very comprehensive set of bibliographical notes. These latter make the book a valuable source for further information, particularly as the entries are clearly and accurately annotated.

Part I is in content and style somewhat reminiscent of the writings of Karl Popper—particularly his *Conjectures and Refutations* (London: Routledge & Kegan Paul, 1963) but this reviewer found Wartofsky's exposition somewhat more readable. It should prove interesting and

beneficial to students in philosophy and particularly to those in science. Those in the latter category are usually so grossly naive with respect to the conceptual bases of the processes and procedures to which they are expected to subscribe, that it is hoped a book such as this will be recommended to their attention. Throughout this part Wartofsky, unlike Popper, is content to maintain a descriptive and explicative role and to avoid propounding a particular point of view. He advances a view of science as human activity, describes its development from the pre-scientific era and explicates the contributions to its genesis by the Greeks with particular emphasis on science as critical activity. The result is a coherent exposition that makes foolish the slavish adherence to the "Two Cultures" attitude popularized by C. P. Snow. In fact, Wartofsky's book could be sub-titled "A Refutation of the Two Cultures Myth."

The six chapters in Part II are devoted to a philosophical exposition and analysis of scientific methodology from the problems of "observation" through "models," "measurement," "experiment," "induction and probability" to the context of "explanation" by laws and theories. This is perhaps the most rewarding part of the book. The author assiduously maintains a philosophical perspective by giving the essential minimum of the methodological characteristics necessary to make his philosophical probings relevant and comprehensible. In our age which is typified by glib statements about and references to such things as "models," "experiments," "tests," "laws," and "theories" it is refreshing to find a responsible statement about them that sets each in a relevant perspective. This reviewer has long been interested in and concerned by the inadequate conceptual foundation of educational research. For his students, Wartofsky's book is now a required study.

In Part III Wartofsky treats "Causality," "Space, Time, and Matter," "Reduction and Explanation in the Biological Sciences," and "Some Fundamental Concepts in the Human Sciences." The four chapters cohere and must be viewed as a whole. If read as a whole, they relate the scientific and the humanistic as two interrelated and integrated aspects of a single culture. Wartofsky's is not a stereotyped exposition of the mechanistic processes nor is it a mere description of a series of elements. It is a probe into the conceptual foundations and therefore consistent with the aim and the title of the book.

Marx Wartofsky has written a good book which can be confidently recommended to philosophers, scientists in all domains, and students in all fields. It is readable and should not prove too difficult for a significant proportion of laymen, and those who are willing to devote some effort to its study are not likely to remain appropriately categorized as laymen.

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